<u>TITLE OF THE INVENTION</u>

INFORMATION PROCESSING APPARATUS, IMAGE INPUT APPARATUS,

METHOD OF CONTROLLING IMAGE PROCESSING APPARATUS,

5   METHOD OF CONTROLLING IMAGE INPUT APPARATUS, IMAGE

INPUT SYSTEM, AND STORAGE MEDIUM

BACKGROUND OF THE INVENTION

10   Field of the Invention

The present invention relates to an information

processing apparatus which is capable of performing

image processing on input image data, an image input

apparatus, a method of controlling the image processing

15   apparatus, a method of controlling the image input

apparatus, an image input system, and a storage medium

storing programs for implementing these methods.

Description of the Related Art

20   An image input system has been proposed, which is

comprised of an image input apparatus such as a scanner

having an original feeding function of continuously

feeding originals, and an information processing

apparatus such as a personal computer (PC) connected to

25   the scanner via a cable or the like.

On a scanner side of an image input system of this

kind, in general, after a first sheet of a bundle of

originals has been fed and image data from that original sheet has then been input by an image input section, an image processing section performs image correction processing on the input image by adjusting

5   the brightness and/or contrast thereof or binarizing the image data.

In this image correcting processing, in a mode for inputting multivalued gray or color images, multivalued image data is input from an original, the input image

10   data is subjected to a gamma correction, which corresponds to a set contrast, and a difference corresponding to a set brightness is added to the multivalued data. On the other hand, in a mode for inputting binary images, multivalued image data is

15   input from an original, the input image data is then transformed into binary data using a slice level corresponding to a set brightness as a boundary without adjusting the contrast and brightness.

The image data thus subjected to the image

20   correction processing on the scanner side is transmitted to a personal computer (PC) side, where the image data is stored in a hard disk as, for example, an image file.

In this image input system, however, the image

25   correcting processing including the brightness and contrast adjustment and binarization is executed only on the scanner side. Thus, if the image data obtained

after the image input and corrections does not have a
brightness and/or contrast desired by the user, the
setting for the brightness and/or contrast has to be
changed, and a first sheet of the original bundle has
5   to be set in an original feeding means again to input
the image. This operation has to be repeated until the
optimal brightness and/or contrast is obtained.
Therefore, the conventional image input operation is
inefficient.
10

SUMMARY OF THE INVENTION

It is an object of the present invention to solve
the above-mentioned problems by providing an
15   information processing apparatus which is capable of
enhancing the efficiency of an image input operation by
enabling a desired input image to be obtained without
reentering the image by an image input apparatus, as
well as a method of controlling the information
20   processing apparatus, an image input system, and a
storage medium storing a program for executing the
method.

To attain the above object, a first aspect of the
present invention provides an information processing
25   apparatus connected to an image input apparatus which
is capable of executing predetermined image processing
on input image data and outputting the processed image

data, the information processing apparatus comprising

first storage means for storing image data output from the image input apparatus, instruction input means for inputting setting information for image processing

5   according to an instruction from an operator, and image processing means for executing image processing that can be executed by the image input apparatus, on the image data stored in the first storage means based on the setting information input by the instruction input

10   means.

In a typical embodiment of the first aspect, the image input apparatus is a scanner apparatus having an image processing section that executes predetermined image processing on image data input by reading an

15   image, and the first storage means stores image data transmitted from the scanner apparatus.

The image processing section of the scanner apparatus executes image processing related to image correction, and the image processing means executes

20   image correction that can be executed by the image processing section of the scanner apparatus.

The image correction includes processes related to contrast adjustment, brightness adjustment, and binarization of an image.

25   The scanner apparatus further includes an image input section that feeds an original and inputs image data by reading an image from the fed original.

The information processing apparatus according to the first aspect further comprises display means for displaying the image data processed by the image processing means.

5   Preferably, the image processing means executes image processing on image data temporarily stored in the storage means and the display means displays the processed image data, before the instruction input means inputs set values.

10   More preferably, the information processing apparatus according to the first aspect further comprises second storage means for storing the processed image data after the image processing means has executed image processing based on the setting

15   information.

Preferably, the information processing apparatus according to the first aspect further comprises third storage means for storing setting information input by the instruction input means, and the image processing

20   means executes image processing on second and subsequent image data output from the image input apparatus based on the setting information stored in the third storage means.

Preferably, the information processing apparatus

25   according to the first aspect further comprises selecting means for selecting either a first mode in which the image input apparatus executes the image

processing or a second mode in which the information processing apparatus executes the image processing, according to an instruction input by the operator.

In a typical application of the present invention, the image input apparatus is a scanner apparatus, and the information processing apparatus is a personal computer connected to the scanner apparatus via a communication cable.

Preferably, the information processing apparatus according to the first aspect further comprises transmitting means for transmitting the setting information used for the image processing by the image processing means, to the image input apparatus.

In a preferred embodiment of the first aspect, the transmitting means transmits the setting information to the image input apparatus after first image data stored in the first storage means has been processed by the image processing means.

Preferably, the information processing apparatus according to the first aspect further comprises display means for displaying the image data processed by the image processing means.

More preferably, the image input apparatus is a scanner apparatus having an image processing section that executes predetermined image processing on image data input by reading an image, and the first storage means stores image data transmitted from the scanner

apparatus.

Further preferably, the image processing section of the scanner apparatus executes image processing related to image correction based on the setting

5 information transmitted from the transmitting means, and the image processing means executes image correction that can be executed by the image processing section of the scanner apparatus.

To attain the above object, the first aspect of

10 the present invention also provides a method of controlling an information processing apparatus connected to an image input apparatus which is capable of executing predetermined image processing on input image data and outputting the processed image data, the

15 method comprising a first storing step of storing image data output from the image input apparatus, in a storage section, an instruction input step of inputting setting information for image processing according to an instruction from an operator, and an image

20 processing step of executing image processing that can be executed by the image input apparatus, on the image data stored in the storage section based on the setting information input in the instruction input step.

To attain the above object, the first aspect of

25 the present invention further provides a computer-readable storage medium storing a program code for implementing a method of controlling an information

processing apparatus connected to an image input apparatus which is capable of executing predetermined image processing on input image data and outputting the processed image data, the program code comprising a

5 storing module for storing image data output from the image input apparatus, in a storage section, an instruction input module for inputting setting information for image processing according to an instruction from an operator, and an image processing

10 module for executing image processing that can be executed by the image input apparatus, on the image data stored in the storage means based on the setting information input by the instruction input module.

15 It is another object of the present invention to provide an information processing apparatus which is capable of enhancing the efficiency of an image input operation by enabling a desired input image to be obtained without reentering the image by a scanner

20 apparatus two or more times, as well as a method of controlling the information processing apparatus, and a storage medium storing a program for executing the method.

To attain the above object, a second aspect of the

25 present invention provides an information processing apparatus connected via a communication cable to a scanner apparatus, the scanner apparatus comprising an

image input section that feeds an original and inputs

image data by reading an image from the fed original,

and an image correcting section that executes

predetermined image correction on the image data input

5   by the image input section, the scanner apparatus being

capable of transmitting the image data corrected by the

image correcting section, the information processing

apparatus comprising first storage means for storing

image data transmitted from the scanner apparatus,

10   first image correcting means for executing image

correction that can be executed by the scanner

apparatus, on the image data stored in the first

storage means, display means for displaying the

corrected image data, instruction input means for

15   inputting setting information for image correction

according to an instruction from an operator, second

image correcting means for executing image correction

that can be executed by the scanner apparatus, on the

image data stored in the first storage means based on

20   the setting information input by the instruction input

means, and second storage means for storing the image

data corrected by the second image correcting means.

     To attain the above object, the second aspect of

the present invention also provides a method of

25   controlling an information processing apparatus

connected via a communication cable to a scanner

apparatus, the scanner apparatus comprising an image

input section that feeds an original and inputs image

data by reading an image from the fed original, and an

image correcting section that executes predetermined

image correction on the image data input by the image

5 input section, the scanner apparatus being capable of

transmitting the image data corrected by the image

correcting section, the method comprising a first

storing step of storing image data transmitted from the

scanner apparatus, in a storage section, a first image

10 correcting step of executing image correction that can

be executed by the scanner apparatus, on the image data

stored in the first storing step, a display step of

displaying the corrected image data, an instruction

input step of inputting setting information for image

15 correction according to an instruction from an operator,

a second image correcting step of executing image

correction that can be executed by the scanner

apparatus, on the image data stored in the first

storing step based on the setting information input in

20 the instruction input step, anda second storing step of

storing the image data corrected in the second image

correcting step, in a storage section.

It is still another object of the present

invention to provide an information processing

25 apparatus which is capable of enhancing the efficiency

of an image input operation by enabling a desired input

image to be obtained without reentering the image by a

scanner apparatus two or more times, and by reducing

the time and labor for carrying out setting operations

by an operator, as well as a method of controlling the

information processing apparatus, and a storage medium

5   storing a program for executing this method.

To attain the above object, a third aspect of the

present invention provides an information processing

apparatus connected via a communication cable to a

scanner apparatus, the scanner apparatus comprising an

10   image input section that feeds an original and inputs

image data by reading an image from the fed original,

and an image correcting section that executes

predetermined image processing on the image data input

by the image input section, the scanner apparatus being

15   capable of transmitting the image data corrected by the

image correcting section, the information processing

apparatus comprising first storage means for storing

image data on a first original sheet transmitted from

the scanner apparatus, first image correcting means for

20   executing image correction that can be executed by the

scanner apparatus, on the image data stored in the

first storage means, display means for displaying the

corrected image data, instruction input means for

inputting setting information for image correction

25   according to an instruction from an operator, second

image correcting means for executing image correction

that can be executed by the scanner apparatus, on the

image data stored in the first storage means based on
the setting information input by the instruction input
means, second storage means for storing the image data
corrected by the second image correcting means, third

5 storage means for storing the setting information input
by the instruction input means, fourth storage means
for storing image data on second and subsequent
original sheets transmitted from the scanner apparatus,
in response to storing of the image data on the first

10 original sheet in the second storage means, third image
correcting means for executing image correction that
can be executed by the scanner apparatus, on the image
data stored in the fourth storage means based on the
setting information stored in the third storage means,

15 and fifth storage means for storing the image data
corrected by the third image correcting means.

    To attain the above object, the third aspect of
the present invention also provides a method of
controlling an information processing apparatus

20 connected via a communication cable to a scanner
apparatus the scanner apparatus comprising an image
input section that feeds an original and inputs image
data by reading an image from the fed original, and an
image correcting section that executes predetermined

25 image processing on the image data input by the image
input section, the scanner apparatus being capable of
transmitting the image data corrected by the image

correcting section, the method comprising a first

storing step of storing image data on a first original

sheet transmitted from the scanner apparatus, in a

storage section, a first image correcting step of

5   executing image correction that can be executed by the

scanner apparatus, on the image data stored in the

first storing step, a display step of displaying the

corrected image data, an instruction input step of

inputting setting information for image correction

10   according to an instruction from an operator, a second

image correcting step of executing image correction

that can be executed by the scanner apparatus, on the

image data stored in the first storing step based on

the setting information input in the instruction input

15   step, a second storing step of storing the image data

corrected in the second image correcting step, in a

storage section, a third storing step of storing the

setting information input in the instruction input step,

in a storage section, a fourth storing step of storing

20   image data on second and subsequent original sheets

transmitted from the scanner apparatus in a storage

section, in response to storing of the image data on

the first original sheet in the second storing step, a

third image correcting step of executing image

25   correction that can be executed by the scanner

apparatus, on the image data stored in the fourth

storing step based on the setting information stored in

the third storing step, and a fifth storing step of storing the image data corrected in the third image correcting step, in a storage section.

It is a further object of the present invention to provide an information processing apparatus which is capable of enhancing the efficiency of an image input operation and further improving an image input processing speed, by enabling a desired input image to be obtained without reentering the image by a scanner apparatus two or more times, and by reducing the time and labor for carrying out setting operations by an operator, as well as a method of controlling the information processing apparatus, and a storage medium storing a program for executing the method.

To attain the above object, a fourth aspect of the present invention provides an information processing apparatus connected via a communication cable to a scanner apparatus, the scanner apparatus comprising an image input section that feeds an original and inputs image data by reading an image from the fed original, and an image correcting section that executes predetermined image processing on the image data input by the image input section, the scanner apparatus being capable of transmitting the image data corrected by the image correcting section, the information processing apparatus comprising first storage means for storing image data on a first original sheet transmitted from

the scanner apparatus, first image correcting means for

executing image correction that can be executed by the

scanner apparatus, on the image data stored in the

first storage means, display means for displaying the

5   corrected image data, instruction input means for

inputting setting information for image correction

according to an instruction from an operator, second

image correcting means for executing image correction

that can be executed by the scanner apparatus, on the

10   image data stored in the first storage means based on

the setting information input by the instruction input

means, second storage means for storing the image data

corrected by the second image correcting means,

transmitting means for transmitting the setting

15   information input by the instruction input means, to

the scanner apparatus, and third storage means for

storing image data on second and subsequent original

sheets which have been transmitted from the scanner

apparatus after being corrected based on the setting

20   information by the image correcting section of the

scanner apparatus.

   To attain the above object, the fourth aspect of

the present invention also provides a method of

controlling an information processing apparatus

25   connected via a communication cable to a scanner

apparatus, the scanner apparatus comprising an image

input section that feeds an original and inputs image

data by reading an image from the fed original, and an image correcting section that executes predetermined image processing on the image data input by the image input section, the scanner apparatus being capable of

5 transmitting the image data corrected by the image correcting section, the method comprising a first storing step of storing image data on a first original sheet transmitted from the scanner apparatus, in a storage section, a first image correcting step of

10 executing image correction that can be executed by the scanner apparatus, on the image data stored in the first storing step, a display step of displaying the corrected image data, an instruction input step of inputting setting information for image correction

15 according to an instruction from an operator, a second image correcting step of executing image correction that can be executed by the scanner apparatus, on the image data stored in the first storing step based on the setting information input in the instruction input

20 step, a second storing step of storing the image data corrected in the second image correcting step, in a storage section, a transmitting step of transmitting the setting information input in the instruction input step, to the scanner apparatus, and a third storing

25 step of storing, in a storage section, image data on second and subsequent original sheets which have been transmitted from the scanner apparatus after being

corrected based on the setting information by the image correcting section of the scanner apparatus.

It is a still further object of the present invention to provide an information processing apparatus which allows an operator to determine whether an image input apparatus or the information processing apparatus is to execute image processing on the input image, depending on the operator's needs, as well as a method of controlling the information processing apparatus.

To attain the above object, a fifth aspect of the present invention provides an information processing apparatus connected to an image input apparatus which is capable of executing predetermined image processing on input image data and outputting the processed image data, the information processing apparatus comprising selecting means for selecting either a first mode in which the image input apparatus executes image processing or a second mode in which the image processing apparatus executes image processing, according to an instruction input by an operator, storage means for storing image data output from the image input apparatus, instruction input means for inputting setting information for image processing according to an instruction from an operator, and image processing means for executing image processing on the image data stored in the storage means based on the

setting information input by the instruction input means, if the selecting means selects the second mode.

To attain the above object, the fifth aspect of the present invention also provides a method of

5 controlling an information processing apparatus connected to an image input apparatus which is capable of executing predetermined image processing on input image data and outputting the processed image data, the method comprising a selecting step of selecting either

10 a first mode in which the image input apparatus executes image processing or a second mode in which the image processing apparatus executes image processing, according to an instruction input by an operator, a storing step of storing image data output from the

15 image input apparatus, in a storage section, an instruction input step of inputting setting information for image processing according to an instruction from an operator, and an image processing step of executing image processing on the image data stored in the

20 storing step based on the setting information input in the instruction input step, if the second mode is selected in the selecting step.

It is another object of the present invention to provide an information processing apparatus which is

25 capable of enhancing the speed of image processing on the input image, as well as a method of controlling the information processing apparatus.

To attain the above object, a sixth aspect of the present invention provides an information processing apparatus connected to an image input apparatus which is capable of executing predetermined image processing

5   on input image data and outputting the processed image data, the information processing apparatus comprising storage means for storing image data output from the image input apparatus, instruction input means for inputting setting information for image processing

10 according to an instruction from an operator, image processing means for executing image processing on the image data stored in the storage means based on the setting information input by the instruction input means, and transmitting means for transmitting the

15 setting information used for the image processing by the image processing means, to the image input apparatus.

To attain the above object, the sixth aspect of the present invention also provides a method of

20 controlling an information processing apparatus connected to an image input apparatus which is capable of executing predetermined image processing on input image data and outputting the processed image data, the method comprising a storing step of storing image data

25 output from the image input apparatus, in a storage section, an instruction input step of inputting setting information for image processing according to an

instruction from an operator, an image processing step

of executing image processing on the image data stored

in the storing step based on the setting information

input in the instruction input step, and a transmitting

5   step of transmitting the setting information used for

the image processing in the image processing step, to

the image input apparatus.

It is still another object of the present

invention to provide an image input apparatus which is

10   capable of enhancing the efficiency of an image input

operation by enabling a desired input image to be

obtained without reentering the image by the image

input apparatus, as well as a method of controlling the

image input apparatus, an image input system, and a

15   storage medium storing a program for executing the

method.

To attain the above object, a seventh aspect of

the present invention provides an image input apparatus

connected to an information processing apparatus which

20   is capable of executing predetermined image processing

on input image data and storing the processed image

data, the image input apparatus comprisinginput means

for inputting image data, and image processing means

for executing image processing that can be executed by

25   the image processing apparatus, on the image data input

by the input means, and the image processing means

executes image processing on the image data input by

the input means, depending on contents of image

processing executed by the image processing apparatus.

Preferably, the information processing apparatus

executes image processing on the image data based on

5   setting information input by an operator, and the image

processing means executes image processing on the image

data input by the input means, based on the setting

information transmitted from the image processing

apparatus.

10   In a preferred embodiment of the seventh aspect,

the image input apparatus further comprises determining

means for determining whether the image data input by

the input means is from a first original sheet, and if

the determining means determines that the image data is

15   from the first original sheet, the image processing

means does not execute image processing on the image

data input by the input means, and if the determining

means determines that the image data is not from the

first original sheet, the image processing means

20   executes image processing on the image data input by

the input means.

In a typical embodiment, the image input apparatus

is a scanner apparatus, and the input means inputs

image data by reading an image.

25   Preferably, the image processing means executes

image processing related to image correction, and the

image processing apparatus executes image correction

that can be executed by the image processing means.

Typically, the image correction includes
processing related to contrast adjustment, brightness
adjustment, and binarization of an image.

5   In a preferred embodiment, the input means inputs
image data by reading an image, and if the determining
means determines that the image data is not from the
first original sheet, the input means inputs image data
by continuously reading second and subsequent original

10   sheets, and the image processing means executes image
processing on the image data input by the input means..

Preferably, the image input apparatus is a scanner
apparatus, and the image processing apparatus is a
personal computer connected to the scanner apparatus

15   via a communication cable.

To attain the above object, the seventh aspect of
the present invention also provides a method of
controlling an image input apparatus connected to an
information processing apparatus which is capable of

20   executing predetermined image processing on input image
data and storing the processed image data, the method
comprising an input step of inputting image data, an
image processing step of executing image processing
that can be executed by the image processing apparatus,

25   on the image data input in the input step, and the
image processing step comprises executing image
processing on the image data input in the input step,

depending on contents of image processing executed by the image processing apparatus.

To attain the above object, the seventh aspect of the present invention further provides a computer-readable storage medium storing a program code for implementing a method of controlling an image input apparatus connected to an information processing apparatus which is capable of executing predetermined image processing on input image data and storing the processed image data, the program code comprising an input module for inputting image data, and an image processing module for executing image processing that can be executed by the image processing apparatus, on the image data input by the input module, and the image processing module executes image processing on the image data input by the input module, depending on contents of image processing executed by the image processing apparatus.

It is a further object of the present invention to provide a scanner apparatus which is capable of enhancing the efficiency of an image input operation and further improving an image input processing speed, by enabling a desired input image to be obtained without reentering the image by the scanner apparatus two or more times, and by reducing the time and labor for carrying out setting operations by an operator, as well as a method of controlling the scanner apparatus,

and a storage medium storing a program for executing the method.

To attain the above object, an eighth aspect of the present invention provides a scanner apparatus

5   connected to an image processing apparatus which is capable of executing predetermined image correction on input image data based on setting information input by an operator and storing the corrected image data, the scanner apparatus comprising input means for feeding an

10 original and inputting image data by reading an image from the fed original, image processing means for executing image correction that can be executed by the image processing apparatus, on the image data input by the input means, and determining means for determining

15 whether the image data input by the input means is from a first original sheet, and if the determining means determines that the image data is not from the first original sheet, the image processing means executes image processing on the image data input by the input

20 means, based on the setting information transmitted from the image processing apparatus.

To attain the above object, the eighth aspect of the present invention also provides a method of controlling a scanner apparatus connected to an image

25 processing apparatus which is capable of executing predetermined image correction on input image data based on setting information input by an operator and

storing the corrected image data, the method comprising

an input step of feeding an original and inputting

image data by reading an image from the fed original,

an image processing step of applying image correction

5   that can be executed by the image processing apparatus,

on the image data input in the input step, and a

determining step of determining whether the image data

input in the input step is from a first original sheet,

and if it is determined in the determining step that

10 the image data is not from the first original sheet,

the image processing step executes image processing on

the image data input in the input step, based on the

setting information transmitted from the image

processing apparatus.

15   It is another object of the present invention to

provide an image input apparatus which allows the

operator to determine whether the image input apparatus

or an information processing apparatus is to execute

image processing on the input image, depending on the

20 operator's needs, as well as a method of controlling

the image input apparatus.

To attain the above object, a ninth aspect of the

present invention provides an image input apparatus

connected to an information processing apparatus which

25 is capable of executing predetermined image processing

on input image data and storing the processed image

data, the image input apparatus comprising input means

for inputting image data, image processing means for
executing image processing on the image data input by
the input means, and if the image processing apparatus
is to execute image processing on the image data input

5   by the input means, the image processing means does not
execute image processing on the image data input by the
input means.

    To attain the above object, the ninth aspect of
the present invention also provides a method of

10   controlling an image input apparatus connected to an
information processing apparatus which is capable of
executing predetermined image processing on input image
data and storing the processed image data, the method
comprising an input step of inputting image data, an

15   image processing step of executing image processing on
the image data input in the input step, and if the
image processing apparatus is to execute image
processing on the image data input in the input step,
image processing on the image data input in the input

20   step is not executed in the image processing step.

    Further, to attain one or more of the above
objects, the present invention provides an image input
system including an image input apparatus which is
capable of executing predetermined image processing on

25   input image data and outputting the processed image
data, and an image processing apparatus connected to
the image input apparatus, wherein the image input

apparatus comprises input means for inputting image data, and first image processing means for executing image processing on the image data input by the input means, wherein the information processing apparatus

5   comprises storage means for storing image data output from the image input apparatus, instruction input means for inputting setting information for image processing according to an instruction from an operator, and second image processing means for executing image

10   processing that can be executed by the first image processing means, on the image data stored in the storage means based on the setting information input by the instruction input means, and wherein the first image processing means executes image processing on the

15   image data input by the input means, depending on contents of image processing executed by the second image processing means.

Further, to attain one or more of the above objects, the present invention provides an image input

20   system including a scanner apparatus comprising an image input section that feeds an original and inputs image data by reading an image from the fed original, and an image correcting section that executes predetermined image processing on the image data input

25   by the image input section, the scanner apparatus being capable of transmitting the image data corrected by the image correcting section, to an external apparatus, and

an image processing apparatus connected to the scanner

apparatus via a communication cable, wherein the

scanner apparatus comprisesinput means for feeding an

original and inputting image data by reading an image

5   from the fed original, first image correcting means for

executing image correction on the image data input by

the input means, and determining means for determining

whether the image data input by the input means is from

a first original sheet, wherein the information

10   processing apparatus comprises first storage means for

storing image data transmitted from the scanner

apparatus, second image correcting means for executing

image correction that can executed by the first image

correcting means, on the image data stored in the first

15   storage means, display means for displaying the

corrected image data, instruction input means for

inputting setting information for the image correction

according to an instruction from an operator, third

image correcting means for executing image correction

20   that can be executed by the first image correcting

means, on the image data stored in the first storage

means based on the setting information input by the

instruction input means, and second storage means for

storing the image data corrected by the third image

25   correcting means, and wherein if the determining means

determines that the image data is not from a first

original sheet, the first image correcting means

executes image correction on the image data input by the input means, based on the setting information transmitted from the information processing apparatus.

The above and other objects, features, and advantages of the present invention will become more apparent from the following detailed description taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a schematic view of an image input system according to a first embodiment of the present invention;

FIG. 2 is a sectional view schematically showing the structure of a scanner 1 shown in FIG. 1;

FIG. 3 is a functional block diagram schematically showing the constitution of a personal computer (PC) 2 shown in FIG. 1;

FIG. 4 is a flow chart showing an image correction selecting process;

FIG. 5 is a flow chart showing an image input process in a scanner-side image correcting mode;

FIG. 6 is a flow chart showing an image correcting process (step S105) shown in FIG. 5;

FIG. 7 is a flow chart showing the operation of the image input system according to the first embodiment;

FIG. 8 is a continued part of the flow chart of FIG. 7;

FIG. 9 is a flow chart showing the operation of an image input system according to a second embodiment of the present invention;

FIG. 10 is a continued part of the flow chart of FIG. 9;

FIG. 11 is a flow chart showing the operation of an image input system according to a third embodiment of the present invention; and

FIG. 12 is a continued part of the flow chart of FIG. 11.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

The present invention will be described below with reference to the drawings showing preferred embodiments thereof.

[First Embodiment]

FIG. 1 is a schematic view of an image input system according to a first embodiment of the present invention.

The image input system is comprised of a scanner 1 for executing the input of image data and the like, and a personal computer (PC) 2 for displaying and saving the image data. The scanner 1 and the PC 2 are connected together via a cable 3. The cable 3

functions as both means for transmitting the image data from the scanner 1 to the PC 2 and means for transmitting image correction settings from the PC2 to the scanner.

5   FIG. 2 is a sectional view schematically showing the structure of the scanner 1, shown in FIG. 1.

The scanner 1 is comprised of an original tray 201 in which a bundle of originals are set, motors 202 to 206 for continuously feeding the originals to the

10   original tray 201, a sensor 207 for inputting multivalued gray or color image data from the originals, a CPU 208 for executing calculations related to image corrections such as brightness and contrast adjustment and binarization, and a sensor 209 for detecting

15   whether or not any original is set in the original tray 201.

FIG. 3 is a functional block diagram schematically showing the constitution of the PC 2 shown in FIG. 1.

The PC 2 includes a CPU 2 for executing

20   calculations related to the image corrections such as the brightness and contrast adjustment and the binarization, saving image data, and for controlling the scanner 1. The PC 2 also includes a keyboard 302 which is operated by a user to instruct image input to

25   be started or terminated, to determine whether the image corrections are to be executed by the scanner 1 or the PC 2, or to set the image corrections such as

the brightness and contrast adjustment and the

binarization. The PC 2 also includes a memory 303 that

stores images transmitted from the scanner 1 as well as

settings for the image corrections, a display 304 for

5 displaying image data as images, and a hard disk 305

that saves the image data.

Here, the image corrections executed by the CPU

301 are equivalent to those executed by the CPU 208.

That is, the CPU 301 can execute the image corrections

10 that can be executed by the CPU 208, on image data,

whereas the CPU 208 can execute the image corrections

that can be executed by the CPU 301, on image data. In

the present embodiment, the image corrections will be

described on the assumption that the CPUs 301 and 208

15 can each execute the contrast and brightness adjustment

and the binarization process.

Further, a mouse, a touch panel, or the like may

be used instead of the keyboard 302 to input settings.

A floppy disk or a CD-R may be used instead of the hard

20 disk 305.

FIG. 4 is a flow chart showing an image correction

selecting process.

A user operates the keyboard 302 to select the

scanner 1 or the PC 2 to be used for executing the

25 image corrections (step S51). If the image corrections

are to be executed by the scanner 1, an image input

process in a scanner-side image correcting mode as

shown in FIG. 5, described later, is executed (step
S52). If the image corrections are to be executed by
the PC 2, an image input process in a PC-side image
correcting mode as shown in FIGS. 7 and 8, described
5   later, is executed (step S53).

First, an operation performed if the user
determines that the image corrections are to be
executed by the scanner 1 (the image input process in
the scanner-side image correcting mode) will be
10   described with reference to the flow chart in FIG. 5.

In the scanner 1, the sensor 209 detects whether
or not any original is set in the tray (step S101). If
any original is set therein, the motors 202 to 206 feed
a first sheet of a bundle of originals to the original
15   tray 201 (step S102). At this time, if no original is
set in the original tray 201 (step S101) or an error
such as a jam occurs while the original is being fed
(step S103), the process is terminated.

Then, the sensor 207 inputs an image from the
20   original as image data (step S104), and the image is
subjected to the image correction such as the
brightness and contrast adjustment or the binarization
(step S105) and the image thus subjected to the image
correction is fed to the PC 2 through the cable 3 (step
25   S106). The PC 2 saves the image transmitted from the
scanner 1 in the hard disk (step S107).

In the same manner as the first original sheet,

second and subsequent original sheets are fed by the
motors 202 to 206 of the scanner 1, and images from
these original sheets are input by the sensor 207,
subjected to the image correction, and then transmitted

5 to the PC 2. In the PC 2, the images transmitted from
the scanner 1 are saved in the hard disk 305.

The above operations are repeated until there is
no original set in the original tray 201 (step S101),
the process is terminated due to an error (step S103),

10 or the user inputs a command to suspend the image input,
through the keyboard 302 (step S108).

FIG. 6 is a flow chart showing an image correcting
process (step S105) shown in FIG. 5.

First, the input mode of the image data is

15 determined. If the mode is for inputting multivalued
gray or color images (step S201), then image data input
as multivalued gray or color image data are subjected
to a gamma correction corresponding to a set contrast
(step S202), and a difference corresponding to a set

20 brightness is added to the multivalued image data.

On the other hand, if the mode is for inputting
binary images (step S201), image data input as
multivalued gray image data are transformed into binary
data using a slice level corresponding the designated

25 brightness as a boundary (step S204).

Next, an operation performed if the user
determines that the image corrections are to be

executed by the PC 2 (the image input process in the PC-side image correcting mode) will be described with reference to the flow chart in FIGS. 7 and 8. FIG. 7 shows an operation on the scanner side, and FIG. 8

5   shows an operation on the PC side.

In the scanner 1, the sensor 209 detects whether or not any original is set in the tray (step S301). If any original is set therein, the motors 202 to 206 feed a first original sheet (step S302). Then, the sensor

10   207 inputs image data from the original (step S304), and the input image data is then transmitted to the PC 2 without being subjected to the above described image correction (such as the brightness and/or contrast adjustment or the binarization) (step S305).

15   In the PC 2, first, the image transmitted from the scanner 1 is stored in the memory 303 (step S306). Subsequently, the image data in the memory is subjected to the image correction (step S307), and the corrected image data is displayed on the display 304 as an image

20   (step S308).

At this time, the image corrections executed by the CPU 301 of the PC 2 are equivalent to those executed by the CPU 208 of the scanner 1, as described above. That is, as shown in the flow chart in FIG. 6,

25   in the mode for inputting multivalued gray or color images, a gamma correction corresponding to the set contrast is executed, and a difference corresponding to

the set brightness is added to the multivalued image data. Further, in the mode for inputting binary images, the image data is transformed into binary data using a slice level corresponding to the designated brightness

5　as a boundary without having the contrast and brightness thereof adjusted.

When the user inputs a command to adjust the brightness and/or contrast, through the keyboard 302 (step S309), operations are repeated, which comprise

10　subjecting the image stored in the memory 303 to the image correction again and displaying the corrected image on the display 304. After these operations have been repeated until the brightness and/or contrast becomes optimal, when the user inputs a command to

15　determine the brightness and/or contrast, through the keyboard 302 (step S310), the corrected image data is saved in the hard disk 305 as a first image (step S311).

In the same manner as the first original sheet, second and subsequent original sheets are fed by the

20　motors 202 to 206 of the scanner 1, and the images input by the sensor 207 are transmitted to the PC 2 without being subjected to the image correction. When the user then adjusts the brightness and/or contrast on the PC 2 and inputs a command to determine the

25　brightness and/or contrast, the corrected image data is saved in the hard disk 305 as second and subsequent images.

The above operations are repeated until there is
no original set in the original tray 201 (step S301),
the process is terminated due to an error (step S303),
or the user inputs a command to suspend the image input,
5   through the keyboard 302 (step S312).

As described above, according to the present
embodiment, the image data can be subjected to the
image correction for parameters such as brightness and
contrast as desired by the user, without the need to
10   input the image from each original set in the original
tray 201, two or more times.

[Second Embodiment]

In the second embodiment, if the user determines
that the image corrections are to be executed by the PC
15   2, the user adjusts an image in a first original sheet
but not images in second and subsequent original sheets.

FIGS. 9 and 10 are a flow chart showing the
operation of an image input system according to the
second embodiment of the present invention.

20   In the scanner 1, the sensor 209 detects whether
or not any original is set in the tray (step S401). If
any original is set therein, the motors 202 to 206 of
the scanner 1 feed a first original sheet (step S402).
Then, when the sensor 207 inputs image data from the
25   first original sheet (step S404), the input image data
is transmitted to the PC 2 without being subjected to
the image correction (step S405).

In the PC 2, first, the image transmitted from the scanner 1 is stored in the memory 303 (step S406). Subsequently, the image data in the memory is subjected to the image correction (step S407), and the corrected

5   image data is displayed on the display 304 as an image (step S409). When the user then adjusts the contrast and/or brightness (steps 410) and inputs a command to determine the contrast and/or brightness (step S411), the corrected image data is saved in the hard disk 305

10 as a first image (step S412). Further, settings for the brightness, contrast, and/or the like which have been adjusted and determined using the keyboard are stored in the memory 303 (step S413).

In the same manner as the first original sheet,

15 second and subsequent original sheets are fed by the motors 202 to 206 of the scanner 1 (step S402). When the sensor 207 inputs an image from the original (step S404), the image is transmitted to the PC 2 without being subjected to the image correction (step S405).

20 In the PC 2, the image transmitted from the scanner 1 is stored in the memory 303 (step S406), and the CPU 301 then executes the image correction using the settings for the brightness, contrast, and/or the like stored in the memory 303 (step S407). Then, the

25 corrected images are saved in the hard disk 305 as second and subsequent images (steps S408 and S412).

The above operations are repeated until there is

no original set in the original tray 201 (step S401),
the process is terminated due to an error (step S403),
or the user inputs a command to suspend the image input,
through the keyboard 302 (step S414).

5   In the above described flow chart, only the first
image is adjusted by the user, and the second and
subsequent images are automatically adjusted based on
the stored settings. The present invention, however,
is not limited to this. For example, the number N of

10   original sheets may be set at a number more than one
such as five and ten beforehand, and it may be so
arranged that the first to N-th images are adjusted by
the user and the subsequent images are adjusted based
on the settings. In this case, the determining

15   condition at the step S408 is changed to "N-th or
Subsequent Original Sheet?".

     As described above, according to the second
embodiment, it is unnecessary for the user to subject
all the original sheets set in the original tray 201 to

20   the image correction for brightness, contrast, and/or
the like as desired by the user and to give
instructions for the corrections for the second and
subsequent original sheets, thereby making the
apparatus more convenient to operate. This method is

25   effective when the entire bundle of original sheets
requires the same image corrections as the first
original sheet.

[Third Embodiment]

In the third embodiment, if the user determines that the image corrections are to be executed by the PC 2, only a first original sheet is subjected to the image correction by the PC 2, whereas second and subsequent original sheets are subjected to the image correction by the scanner 1.

FIGS. 11 and 12 are a flow chart showing the operation of an image input system according to the third embodiment of the present invention. FIG. 11 shows an operation on the scanner side, and FIG. 12 shows an operation on the PC side.

In the scanner 1, the sensor 209 detects whether or not any original is set in the tray (step S501). If any original is set therein, the motors 202 to 206 of the scanner 1 feed a first original sheet (step S502). Then, the sensor 207 inputs image data from the first original sheet (step S504). Then, it is determined whether or not the fed original sheet is the first original sheet (the input image data is the first image data). If the fed original sheet is the first original sheet, the input image data is transmitted to the PC 2 without being subjected to the image correction (steps S505 and S506).

In the PC 2, it is first determined whether or not the image data transmitted from the scanner 1 is from the first original sheet (step S508). If the image

data is from the first original sheet, the image data is stored in the memory 303 (step S509).

Subsequently, the image data stored in the memory 303 is subjected to the image correction (step S510),

5   and the corrected image data is displayed on the display 304 (step S511).

When the user then adjusts the brightness and/or contrast while referring to the displayed image (step S512) and inputs a command to determine his desired

10   brightness and/or contrast (step S513), the corrected image data is saved in the hard disk 305 as first image data (step S514).

Further, the image correction settings for the determined brightness, contrast and/or the like are

15   transmitted to the scanner 1 through the cable 3 (step S515).

Second and subsequent original sheets are fed by the motors 202 to 206 of the scanner 1 (step S502). When the sensor 207 inputs image data from each

20   original sheet (step S504), the image data is subjected to the image correction according to the settings for the brightness, contrast and/or the like which have been transmitted from the PC 2 (steps S505 and S506). Then, the corrected image data is transmitted to the PC

25   2 (step S507). In the PC 2, the image data transmitted from the scanner 1 are saved in the hard disk 305 as second and subsequent image data (steps S508 and S514).

In the above described flow chart, only the first image is adjusted on the PC side, and the second and subsequent images are adjusted on the scanner based on the settings provided by the PC. The present invention,

5 however, is not limited to this. For example, the number N of original sheets may be set at a number more than one such as five and ten beforehand, and it may be so arranged that the first to N-th images are adjusted on the PC side and the subsequent images are adjusted

10 on the scanner side. In this case, the determining conditions at the steps S505 and S508 are changed to "N-th or Subsequent Original Sheet?".

As described above, according to the present embodiment, it is unnecessary for the user to subject

15 all the original sheets set in the original tray 201 to the image corrections for brightness, contrast, and/or the like as desired by the user and to give instructions for the corrections for the second and subsequent original sheets, thereby making the

20 apparatus more convenient to operate. Furthermore, if the image correction processing speed of the scanner 1 exceeds that of the PC 2, a higher processing speed can be achieved compared to the above described second embodiment.

25 The above described control methods can be realized by storing programs according to the flow charts in FIGS. 4 to FIGS. 12, in the memory 303 in the

PC 2 and executing the programs.

Further, the present invention is not limited to the illustrated embodiments but various modifications thereof may be realized. For example, the image

5 corrections are not limited to the brightness and contrast adjustment but may involve adjustment of other parameters that can be adjusted by the user while viewing the image, such as image edge emphasis and angular correction. Moreover, the present invention

10 may employ an image correction that can be adjusted by the user without viewing the image. Still further, alternatively to designating image correction, the image correction may involve the designation of a scanning area on the original or the like.

15 The present invention is not limited to the apparatuses of the above described embodiments but may be applied to a system comprised of a plurality of apparatuses or an apparatus comprised of a single apparatus or device. It goes without saying that the

20 present invention can be implemented by supplying a system or an apparatus with a storage medium in which is stored a program code of software that realizes the function of any of the above described embodiments, and causing a computer (or CPU or MPU) of the system or

25 apparatus to read out and execute the program code stored in the storage medium.

In this case, the program code itself read out

from the storage medium realizes the functions of any
of the above described embodiments, and therefore the
storage medium storing the program code constitutes the
present invention. The storage medium for supplying

5   the program code may be selected from, for example, a
floppy disk, hard disk, optical disk, magneto-optical
disk, CD-ROM, CD-R, magnetic tape, non-volatile memory,
and ROM. Further, it goes without saying that the
functions of the above described embodiments may be

10 accomplished not only by executing the program code
read out by the computer, but also by causing an
operating system (OS) that operates on the computer to
perform a part or the whole of the actual operations
according to instructions of the program code.

15   Furthermore, it is to be understood that the
program code read out from the storage medium may be
written into a memory provided in an expanded board
inserted in the computer, or an expanded unit connected
to the computer, and a CPU or the like provided in the

20 expanded board or expanded unit may perform a part or
all of the actual process according to instructions of
a next program code, so as to accomplish the functions
of the above described embodiments.

Although the present invention has been described

25 in terms of the preferred embodiments, it is not
limited to the above described embodiments but may be
varied and modified within the scope of the appended

claims.